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AVAGO TECHNOLOGIES, LTD. P.O. BOX 1920 DENVER, CO 80201-1920			BOUSIKARIS, LEONIDAS	
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Please find below and/or attached an Office communication concerning this application or proceeding.

DETAILED ACTION

Claim Objections

Claims 13-14 are objected to because of the following informalities:

Claim 13 is dependent from claim 9, which has been canceled. It will be assumed that claim 13 is depended from claim 8, instead.

In claim 14, line 5, the word “patterned” should be changed to “tiled” to cure lack of antecedent basis.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 8, 10, 13-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Birdwell (US 5,877,876) in view of Wu (US 5,946,116).

Regarding claim 8, Birdwell discloses an optical switching/routing system comprising (Figs. 17A, 17B);

a polarization separating sub-system (232A, 234A, 236A) capable of separating an input optical beam 244 into a first optical beam of a first polarization and a second optical beam of a

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second polarization distinct from the first polarization, and emitting a first emitted optical beam of a third polarization (at the output of the top half of the beamsplitter 232A) and a second emitted optical beam of the same third polarization (at the output of the reflecting prism 236A, and after passing through half-wave plate 234A), said emitted first and emitted second optical beams constituting an input channel of said third polarization;

a polarization recombining sub-system (232B, 234B, 236B); and

a grating based selectable switching/routing sub-system (230A, 246, 230B) including at least one pixilated switchable component, said sub-system interposed optically between said polarization separating sub-system (232A, 234A, 236A) and said polarization recombining sub-system (232B, 234B, 236B); and

said selectable switching/routing sub-system capable of switching/routing said input channel to an output channel of a fourth polarization, said output channel constituting a pair of output beams of said fourth polarization (said two beams being one at the input of reflecting prism 242B, and the second one being at the input of beamsplitter 232B);

said polarization recombining sub-system capable of recombining said pair of output beams of said fourth polarization into a final output beam of combined polarization entering output fiber 240B (line 39, col. 18 to line 18, col. 19, lines 7-26, col. 20). It is noted that “234B” in Fig. 17b should be “230B”, based on the above discussion.

However, in Birdwell’s system, the polarization separating sub-system comprises a polarization splitter 232A followed by a half-wave plate 234A, i.e., said system lacks a tiled polarization converter used in conjunction with the polarization splitter. Wu discloses an optical switching/routing system (Fig. 5a), wherein at the input end, a birefringent element 30 splitting

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an input beam into two beams of different polarization is followed by a tiled polarization converter 100, whose one region receives one of the outputs of the birefringent element and outputs a beam with different polarization and another region receives the other one of the outputs of the birefringent element and outputs a beam without changing the polarization (lines 5-10, col. 7). It is noted that the polarization converter 100 is a “tiled” element since it comprises two sub-units, each having different optical properties. It would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the combination disclosed by Birdwell (i.e., polarization beam splitter in conjunction with a half-wave plate) with the combination taught by Wu (i.e., birefringent element in conjunction with tiled polarization converter) for producing a pair of separated optical beams with the same polarization, since the pair of beams at the output of the polarization splitter taught by Wu are closer in space compared with the polarization splitter taught by Birdwell because of the geometry of the utilized optical elements, thus resulting in a more compact optical system. Furthermore, both systems constitute analogous art in addition to solving the same problem, namely, producing two optical beams having the same polarization.

It is also noted that the optical switching/routing system depicted in Fig. 5a of Wu is the same as the claimed system, except that the selectable switching/routing subsystem is not based on diffractive gratings.

Regarding claim 10, the polarization recombining sub-system comprises a half-wave plate polarization converter 234B (which is not tiled) and a polarization combiner 232B. It would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the combination disclosed by Birdwell (i.e., polarization beam splitter in conjunction

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with a half-wave plate) with the combination taught by Wu (i.e., birefringent element in conjunction with tiled polarization converter) for exactly the same reasons given above.

Regarding claim 13, the third polarization is the same as the first polarization.

Regarding claim 14, the combination birefringent element/polarization splitter 30 followed by the tiled polarization converter 100 in Wu is such that the birefringent element 30 splits an input beam into two beams of different polarization, and wherein the patterned polarization converter 100, comprises one region that receives one of the outputs of the birefringent element and outputs a beam with different polarization and another region that receives the other one of the outputs of the birefringent element and outputs a beam without changing the polarization (lines 5-10, col. 7).

Regarding claim 15, the fourth, third and first polarizations are all the same.

Regarding claim 16, the analysis made in conjunction with claim 14 applies, since the polarization separating sub-system is completely the same as the polarization recombining sub-system, with the two sub-systems being completely symmetrical with respect to an axis intersecting normally element 224 at the middle point (see Fig. 17B).

Allowable Subject Matter

Claims 11-12, 26-30 are allowable over the prior art of record for at least the reason that even though the prior art discloses optical switching systems incorporating polarization-based separating and recombining sub-systems positioned on either end of a grating-based selectable switching/routing sub-system as well as a polarization-based separating/combining system comprising a pair of holographic gratings positioned in series, the prior art fails to teach or

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reasonably suggest, regarding claims 11-12, an optical switching/routing system comprising a polarization splitter/combiner and a patterned polarization converter, where the polarization splitter/combiner comprises a pair of polarization splitter/combiner gratings, and regarding claims 26-30, a polarization separating/combining system comprising a patterned polarization converter optically coupled to first and second gratings of the pair of the polarization sensitive gratings, as set forth by the claimed combination.

Response to Applicant's Arguments

Applicant's arguments filed on 7/3/2006 have been fully considered but they are not persuasive.

Applicant argues that Wu does not disclose a tiled polarization converter. Examiner cannot agree. Polarization converter array 100 is clearly a tiled optical element comprising two separate sub-units, each having different optical properties, and furthermore producing exactly the same result as the claimed tiled polarization converter. Finally, there is strong motivation to combine the completely analogous references of Birdwell and Wu.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after

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the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Leo Boutsikaris whose telephone number is 571-272-2308. The examiner can normally be reached on M-F, 10-6.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on 571-272-2312. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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